

**Amendments to the Claims**

Please cancel Claims 2-4 and 24-46. Please amend Claims 1 and 5. The Claim Listing below will replace all prior versions of the claims in the application:

**Claim Listing**

1. (Currently Amended) A gas separation apparatus comprising:
  - an irradiation chamber for receiving a gas;
  - an ~~irradiation~~ electron beam device for irradiating the gas with an electron beam within the irradiation chamber for causing molecules of the gas to break apart into larger and smaller constituent components;
  - a separation arrangement for ~~applying a force for~~ separating the larger and smaller constituent components from each other within the irradiation chamber by forcing the larger and smaller constituent components toward different regions of the irradiation chamber ~~due to differential motion characteristics of the larger and smaller constituent components,~~ the separation arrangement including a rotary member capable of rotating about an axis, rotation of the rotary member for causing the larger constituent components to move radially outwardly relative to the axis of the rotary member and the smaller constituent components; and
  - a first outlet for removing the smaller constituent components from the irradiation chamber; and
  - a second outlet for removing the larger constituent components from the irradiation chamber.
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Currently Amended) ~~The apparatus of Claim 3 in which~~ A gas separation apparatus comprising:
  - an irradiation chamber for receiving a gas;

an electron beam device for irradiating the gas with an electron beam within the irradiation chamber for causing molecules of the gas to break apart into larger and smaller constituent components;

a separation arrangement for separating the larger and smaller constituent components from each other within the irradiation chamber by forcing the larger and smaller constituent components toward different regions of the irradiation chamber, the separation arrangement including a waveform generator for separating the smaller constituent components from the larger constituent components;

a first outlet for removing the smaller constituent components from the irradiation chamber; and

a second outlet for removing the larger constituent components from the irradiation chamber.

6. (Original) The apparatus of Claim 1 in which the smaller constituent components comprise  $H^+$  ions, the apparatus further comprising a reaction chamber in communication with the first outlet for reacting the  $H^+$  ions with oxygen.
7. (Original) The apparatus of Claim 6 further comprising an electrical connection between the irradiation chamber and the reaction chamber for conveying electrons from the irradiation chamber to the reaction chamber.
8. (Original) The apparatus of Claim 7 further comprising an electrical device electrically connected to said electrical connection and driven by said electrons.
9. (Original) The apparatus of Claim 1 further comprising a proton conducting device for extracting protons from the irradiation chamber.
10. (Previously Presented) A gas separation apparatus comprising:
  - an irradiation chamber for receiving a gas, the irradiation chamber including a rotary member capable of rotating about an axis;
  - an irradiation device for irradiating the gas within the irradiation chamber for causing molecules of the gas to break apart into larger and smaller constituent components, rotation of the rotary member for separating the larger and smaller constituent components from each other within the irradiation chamber by forcing the larger and smaller constituent components toward different regions of the irradiation

chamber, and causing the larger constituent components to move radially outwardly relative to the axis of the rotary member and the smaller constituent components; and

a first outlet positioned near the axis of the rotary member for removing the smaller constituent components.

11. (Original) The apparatus of Claim 10 further comprising a second outlet positioned radially outwardly from the rotary member for removing the larger constituent components.
12. (Original) The apparatus of Claim 11 in which the irradiation device is an electron beam device for irradiating the gas with an electron beam.
13. (Original) The apparatus of Claim 12 further comprising a first collection unit connected to the first outlet for collecting the smaller constituent components.
14. (Original) The apparatus of Claim 13 further comprising a second collection unit connected to the second outlet for collecting the larger constituent components.
15. (Original) The apparatus of Claim 14 further comprising a recirculating passageway for recirculating some components back into the irradiation chamber.
16. (Original) The apparatus Claim 15 further comprising a recirculating pump for recirculating said components.
17. (Original) The apparatus of Claim 10 further comprising a gas source connected to the reaction chamber by an inlet passageway.
18. (Original) The apparatus of Claim 10 in which the rotary member includes a series of radially extending partitions.
19. (Previously Presented) A gas separation apparatus comprising:
  - an irradiation chamber for receiving a gas;
  - an irradiation device for irradiating the gas within the irradiation chamber for causing molecules of the gas to break apart into larger and smaller constituent components;

a waveform generator for separating the larger and smaller constituent components from each other within the irradiation chamber by forcing the larger and smaller constituent components toward different regions of the irradiation chamber; and a first outlet for removing the smaller constituent components.

20. (Original) The apparatus of Claim 19 further comprising a second outlet for removing the larger constituent components.
21. (Original) The apparatus of Claim 20 in which the irradiation device is an electron beam device for irradiating the gas with an electron beam.
22. (Original) The apparatus of Claim 19 in which the waveform generator provides a cyclic bi-directional time variant electric field.
23. (Original) The apparatus of Claim 22 in which the cyclic bi-directional time variant electric field extends between first and second regions.
- 24-46 (Cancelled)